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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/731,622 | 12/09/2003 | Michael Kowalchik | EMC-01-102CIP1 | 4760 |
| 7590 | 03/09/2005 | | EXAMINER | |
| Scott A. Ouellette, Esq. EMC Corporation Office of the General Counsel 176 South Street Hopkinton, MA 01748 | | | CHACE, CHRISTIAN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2187 | |
| DATE MAILED: 03/09/2005 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/731,622 | KOWALCHIK ET AL. | |
| | Examiner | Art Unit | |
| | Christian P. Chace | 2187 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 December 2003.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 30-50 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 30-50 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 09 December 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to Preliminary Amendment filed 9 December 2003. Claims 1-29 are canceled, and claims 30-50 are pending.

Claim Objections

Claim 46 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. It is identical to the claim upon which it depends.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 30-33 and 35-50 are rejected under 35 U.S.C. 102(b) as being anticipated by Brant et al (US Patent #5,805,787).

With respect to independent claim 30, a data storage device is disclosed in figure 1.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1, line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

With respect to claim 31, the device interface comprising an interface configured to conform to a protocol is disclosed in column 6, lines 39-44, where the protocol is "SCSI-type connections."

With respect to claim 32, the protocol comprising at least one of the following: SCSI, Fibre Channel, and "Infiniband" is disclosed in column 6, lines 39-44, which specifically discloses SCSI.

With respect to claims 33, 44, 46, and 49, the plurality of non-volatile memory devices including mechanical or "microelectromechanical" is disclosed column 1 as disks.

With respect to claim 35, the controller comprising a controller configured to implement or access more than two disks in a RAID scheme is disclosed in column 5, lines 34, 36, and 44, in general. RAID stands for, "Redundant Array of Independent Disks." In this case, column 5, line 59 recites "Controller 20 can include independent paths to write data to its memory in a mirrored fashion." Mirroring is redundant storage of data. The cache being an array is disclosed in column 4, line 15, for example.

Figure 1 clearly shows separate disks, and, therefore, independent disks. Therefore, RAID is explicitly disclosed embodied in the invention of Brant et al.

With respect to claims 36 and 48, the scheme implemented by the controller comprising a RAID scheme is disclosed as discussed supra with respect to instant claims 10, 21, and 28. The RAID scheme being independent of a hierarchically higher RAID controller that sends the data storage device data is discussed in column 5, lines 12-35. By stating that the system of Brant et al, which includes RAID, as discussed in the cited passage, that the storage subsystem can fill **several** intermediate slots in the hierarchy, as stated in line 31 of the instant passage, Brant et al anticipates hierarchically higher RAID controllers.

With respect to claim 37, said data storage device further comprising a cache manager is disclosed in figure 1 as #20, and its operation is further discussed in column 6, line 35, for example.

With respect to claim 38, the cache manager comprising a manager configured to perform at least one of the following: translate an address of a different storage device (for example, back-end storage), cache data included in a write request, load data from the different storage device, and remove cached data is disclosed in column 6, line 35, for example. The controller #20 in Brant et al performs the functions of the instantly claimed cache manager as well as the instantly claimed controller of instant claim 1.

However, it happens that all of the following are anticipated by the cited prior art of record, with the instant claim limitations in parenthesis along with the relevant citation in Brant et al:

Requesting data from a back-end storage system (which inherently requires translating the address of that different storage system) (see column 6, lines 50-51);

Retrieving requested data (caching data included in a write request and loading data from the different storage device) from the [at least two] disks [making up the cache] (see column 4, lines 9-19);

Sending data to the back-end system for writing (column 6, lines 50-51);

Determining the location of back-end system data (more address translation) within the [at least two] disks [making up the cache] (column 4, lines 32-48).

Removing data from the [at least two] disks [making up the cache] (removing cached data) (column 4, lines 42-44).

With respect to claim 39, a controller card that includes the controller and connections available to couple with more than one storage card that provides access to the [a] the [at] least two of the [disk] drives is disclosed in column 5, lines 41-45, which discloses ASIC based daughter cards which the disclosed products of Brant et al can be based on. These products of Brant et al are what examiner is rejecting the instant claims over, so it logically follows that “these products” apply to the instant claim language.

With respect to claim 40, the storage card comprising a card having at least one parallel interface to a collection of the drives is disclosed column 5, line 30 as well as lines 41-45, for the reasons as discussed supra with respect to claim 15.

With respect to claim 41, the connection between the controller and storage card comprising a serial connection is disclosed in column 6, line 41, as "SCSI-type connections." SCSI has a serial as well as a parallel "type" connection, and, therefore, the cited passage anticipates the instant claim language.

With respect to claim 42, the controller comprising a bank interface that routes data requests to the appropriate bank of drives is disclosed in figure 1 as #15, as discussed in column 5, lines 54-56, for example.

With respect to independent claim 43, a data storage system is disclosed in figure 1.

At least one first data storage device having a platter size of at least 3.5 inches in diameter is disclosed in column 5, line 39. The hierarchy listed in column 5, from line 12 to line 28, shows the lower levels of the hierarchy having higher capacity disks. To increase capacity on a disk that uses a standard method of data storage, one must, inherently, increase the physical size, or platter size, of that disk.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1, line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A first controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

A second controller that "coordinates" data access to the at least one first data storage device and the at least one second data storage device is disclosed in figure 1, #24.

With respect to independent claim 45, a method of servicing data access requests at a data storage device is disclosed in the abstract, e.g.

Receiving data access requests at a device interface is discussed in column 6, lines 39-44, for example. The host sends and receives data through interface #11 in figure 1.

Accessing a plurality of disk drives (figure 1, #22) with a standard form factor (discussed supra with respect to claim 30, e.g.) in response to the received data access requests is disclosed in column 6, lines 39-48.

With respect to independent claim 47, a data storage device is disclosed in figure 1.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1, line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

The controller comprising a controller configured to implement or access the more than two disks in a RAID scheme is disclosed in column 5, lines 34, 36, and 44, in general. RAID stands for, “Redundant Array of Independent Disks.” In this case, column 5, line 59 recites “Controller 20 can include independent paths to write data to its memory in a mirrored fashion.” Mirroring is redundant storage of data. The cache being an array is disclosed in column 4, line 15, for example. Figure 1 clearly shows separate disks, and, therefore, independent disks. Therefore, RAID is explicitly disclosed embodied in the invention of Brant et al.

With respect to independent claim 49, the limitations have been discussed and anticipated *supra* with respect to claims 30 and 33, e.g.

With respect to independent claim 50, the limitations have been addressed *supra* with respect to claim 30 as well. Examiner notes herein that with respect to the instant claim, examiner interprets the non-volatile memory device to be the disk drive, therefore inherently “emulating a disk drive access.”

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brant et al as applied to claim 1, upon which the instant claims depend, above, and further in view of Eckerd et al (US Patent #6,078,498).

Brant et al teaches the data storage device as claimed in claim 30 of the instant application.

The difference between Brant et al and the instant claims are the explicit recitations of a housing, the housing having one of the following form factors: standard, half-height, and low-profile.

However, Eckerd et al disclose a top cover cooperating with the base deck to form an internal, scaled environment for the disc drive in column 3, lines 22-25. This is a housing. In column 6, lines 18-30, Eckerd et al disclose that housing to be a standardized form factor, including low profile, nominal, and half-height.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, having the teachings of Brant et al and Eckerd et al before him/her, to utilize the housing and form factors of Eckerd et al in the invention of Brant et al, because smaller form factor disk drives permit disk subsystems to exploit performance advantages of having more disks to service requests in parallel, as

discussed by Brant et al in column 1, lines 42-45, and because the relative configurations of the mounting plate and chassis can vary depending upon requirements of a given application, as discussed in column 5, lines 15-18 of Eckerd et al.

Double Patenting

Claims 30-50 of this application conflict with claims 1-3, 14-16, and 18-20 of Application No. 10/004,090. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 30-33 and 34-50 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3,

14-16, and 18-20 of copending Application No. 10/004,090. Although the conflicting claims are not identical, they are not patentably distinct from each other because for example, "mechanical memory devices" may be interpreted as "disk drives," for example.

Instant claims 30, 33, 35-36, and 44-50, are anticipated by copending claim 1.

Instant claim 32 is anticipated by copending claim 2.

Instant claims 37-38 are anticipated by copending claim 14.

Instant claim 39 is anticipated by copending claim 15.

Instant claim 40 is anticipated by copending claim 16.

Instant claim 41 is anticipated by copending claim 18.

Instant claim 42 is anticipated by copending claim 19.

Instant claim 43 is anticipated by copending claim 20.

It is noted that "anticipation is the epitome of obviousness."

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 34 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 9 of copending Application No. 10/004,090 in view of Eckerd et al (cited supra). The Graham v. Deere factors are noted supra with respect to the rejection of claim 34, e.g.

This is a provisional obviousness-type double patenting rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571.272.4201. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christian P. Chace
Examiner
Art Unit 2187